

SUBJECT:	FERMI RESEARCH ALLIANCE PROCEDURES PROJECT MANAGEMENT	NUMBER:	12.PM-006
RESPONSIBILITY:	Office of Project Support Services	REVISION:	6.1
APPROVED BY:	Head, Office of Project Support Services	EFFECTIVE:	7/5/16
TITLE	Monthly Status Reporting		

1.0 PURPOSE

This procedure defines the methods used to measure schedule progress on a monthly basis and report the actual performance compared to planned performance for a given period. This information is used to provide various reports required by management, the project, and the customer to manage projects, including those required to use the *FRA Earned Value Management System*.

2.0 SCOPE

This procedure describes the implementation of Earned Value Management for monthly status reporting and analysis. The monthly reporting process describes the project's method of reporting variances in cost and schedule. Internal and external reports will include a comparison of the actual costs and work accomplished to the planned value of the work, derived from baseline plans generated during the planning and budgeting phase. Forecasts of future costs and schedule dates will be made, and corrective actions initiated when problems are identified.

Some projects may include in-kind, un-costed, or contributed labor effort at \$0 cost. If the PM deems it necessary, earned value management for this effort may be performed on hours. For Fermi Labor, the accounting system can collect, actual hours for contributed effort resources at the chargeable task code level, which can be brought into the cost processor. In the processes described in this procedure, the term "costs" will generally refer to both dollar costs and hours.

3.0 RESPONSIBILITIES

3.1 Project Manager (PM) is responsible for

- Reviewing monthly performance data and variance reports and providing acceptance or required corrective action
- Reviewing and approving Monthly Status Report (MSR) draft
- Monitoring corrective action on a monthly basis
- At least annually, requesting the Control Account Managers (CAM) to develop a detailed, bottom-up estimate for the remaining work, to establish a new Estimate to Complete (ETC) and new Estimate at Completion (EAC), for each Control Account (CA).
- Preparing and submitting a project MSR to the Customer and FRA Management
- Coordination and presentation of information at the monthly Project Management Group (PMG) meetings

3.2 Control Account Manager (CAM) is responsible for

- Providing progress information to Project Controls (PCs) staff for input to the Resource Loaded Schedule (RLS) for the monthly report
- Working with Project Financial Analyst (PFA) to prepare and submit monthly accruals to accounting
- Providing narrative input for MSR
- Analyzing cost and schedule variances
- Preparing variance reports and required corrective action plans

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- Monitoring and reporting corrective actions on a monthly basis
- Evaluate and update ETC/EAC when required

3.3 Project Controls (PC) is responsible for

- Retrieving information from the financial management system or PFA
- Requesting monthly status updates from CAMs
- Integrating the RLS status information with actual costs and preparing earned value reports
- Preparing performance reports and distributing to CAMs
- Assisting PM to prepare and publish MSR
- Analyzing ETC/EAC submitted by the CAMs
- Preparing and submitting a draft of the project MSR to the PM for review
- Advising CAMs and PM of FRA EVMS requirements to ensure the project is compliant

3.4 Project Financial Analyst (PFA) is responsible for

- Verifying and reconciling actual cost file that is downloaded from the accounting system and imported into the project cost processor as part of the monthly reporting process
- Working with CAMs to prepare and submit monthly accruals to accounting

4.0 PROCEDURE

The sequence of activities involved in this procedure is illustrated in Appendix C. The sequential action steps are described in this section.

4.1 Monthly Status Report (MSR) Development

The RLS for the Performance Measurement Baseline (PMB) shall be statused by the CAMs for each reporting period, using Earned Value or Performance Measurement Techniques. Once the RLS is statused, the information is used to calculate the Budgeted Cost of Work Performed (BCWP or earned value).

The PFA collects accrual information from CAMs and inputs the information into the Fermilab financial management system. The Project Controls Specialist (PCS) obtains the current period's actual costs from the Fermilab financial management system or the PFA. The PCS integrates the financial data with schedule status information using the cost processor tool. PCs runs earned value reports, comparing actual costs on these reports to the reports generated from Fermilab financial management system, reconciling the project costs to the accounting system.

Finally, PCs prepares the Cost Performance Reports (CPR) that are included in the monthly report provided to the PM and CAMs for review and approval. At a minimum, CPR1 at the control account level shall be produced for each accounting period. Other CPRs may be used as determined by the PM, senior management, and the customer. See Appendix D for sample forms.

4.2 CAM Variance Review and Analysis

PCs provides cost performance reports to the CAMs showing status and variances for their assigned CAs, including both direct and indirect costs. The CAMs are to review the data in the CPRs for their CAs to assess actual progress and costs incurred compared to the baseline plan. The CAMs are to identify and analyze significant cost and schedule variances.

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If variances exceed the defined thresholds, then the CAMs evaluate the variances, ascertain the cause and impact, and if required, propose corrective actions to minimize any negative impact to the project. Variances may be related to direct costs, indirect costs, schedule, or any combination of costs or schedule. Although the project does not control indirect costs, they should still be analyzed and monitored so that corrective actions may be taken and the impact to the Total Project Cost (TPC) is tracked on an ongoing basis.

The Variance Analysis Reporting thresholds are defined as the Red Thresholds in the table in section 4.3. The CAM is to prepare a Variance Analysis Report (VAR) when the cumulative red thresholds have been triggered and submit the report to the PM (or designee) for review and acceptance (see CPR5 in Appendix E). VARs need to describe the variance in sufficient detail such that appropriate actions can be undertaken by the project. After accepting the analysis, the PM (or designee) may note any required corrective actions. These corrective actions must be tracked to completion. A Corrective Action Log (Appendix F) is one tool that may be used to ensure corrective actions are tracked to completion. Using whatever tool the project deems appropriate, the project shall monitor and update corrective actions, at least monthly, until the action is closed.

Variances should be discussed at a monthly project meeting so that corrective actions may be coordinated between the CAMs.

Schedule variances for contributed or in-kind work may be reported in the monthly reports.

4.3 Management Variance Analysis Report (VAR) and Thresholds

For management purposes, a color-coded variance threshold report at the CA level will be produced by PCs for each reporting period. This report gives a more visual indication where management may need to concentrate their efforts in managing the project (see example in Appendix G).

The thresholds to be used in this report are color-coded as Green, Yellow or Red.

- Green variances are small and may not warrant any actions.
- Yellow variances are considered a warning that the variance could trend into the red threshold range, in future reporting periods. These variances should be analyzed to determine if corrective actions are required.
- Red variances are considered significant. Red variances require VARs to be generated per section 4.2 of this procedure.

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The threshold limits for each of the color-coded thresholds are noted in the following tables.

Variance Analysis Thresholds for Control Accounts with Standard Resources		
Green Thresholds – Cost and Schedule Performance falling outside of yellow or red thresholds		
Yellow Thresholds		
Cost Variance Schedule Variance	Type	Threshold limit
Dollars	Current Period	$\geq \pm 5\%$ to $< \pm 10\%$ and $\geq \$50K$
	Cumulative	$\geq \pm 5\%$ to $< \pm 10\%$ and $\geq \$100K$
Red Thresholds		
Cost Variance Schedule Variance	Type	Threshold limit
Dollars	Current Period	$\geq \pm 10\%$ and $\geq \$100K$
	Cumulative	$\geq \pm 10\%$ and $\geq \$200K$

Note: This applies to SV% (Schedule Variance in %) or CV% (Cost Variance in %) and the SV or CV in \$.

Variance Analysis Thresholds for Control Accounts with Optional Uncosted Labor Hours		
Green Thresholds – Cost and Schedule Performance falling outside of yellow or red thresholds		
Yellow Thresholds		
Cost Variance Schedule Variance	Type	Threshold limit
Hours	Current Period	$\geq \pm 5\%$ to $< \pm 10\%$ and ≥ 350 hrs
	Cumulative	$\geq \pm 5\%$ to $< \pm 10\%$ and ≥ 700 hrs
Red Thresholds		
Cost Variance Schedule Variance	Type	Threshold limit
Hours	Current Period	$\geq \pm 10\%$ and ≥ 700 hrs
	Cumulative	$\geq \pm 10\%$ and ≥ 1400 hrs

Note: This applies to SV% (Schedule Variance in %) or CV% (Cost Variance in %) and the SV or CV in hours.

The thresholds in the table above are the default project variance analysis reporting thresholds to be applied to all projects with the following exception. The customer, FRA management or the project may determine that based on specific project requirements, risk level, and budget value the project would be managed more effectively utilizing modified thresholds. Any proposed change to the thresholds shall be presented to the Project Management Group (PMG) for concurrence. If the PMG concurs with the revised thresholds the project's Project Management Plan (PMP) will be revised to include the project-specific thresholds.

A narrative summary of the analysis of those variances that fall within the red thresholds is included in the monthly report.

4.4 Customer Variance Analysis Report and Thresholds

The customer variance analysis reporting thresholds are generally applied to a level higher than the CA (i.e., level 2 or 3 of the WBS); the level is agreed on by the customer and the project. A color-coded variance threshold report at the agreed upon level will be produced by PCs for each reporting period and included in the monthly report (see example in Appendix H).

The threshold limits for each of the color-coded thresholds are noted in the following tables. Unless otherwise directed by the customer, only red cumulative data will need to be addressed and included in reports.

Customer Variance Analysis Report Thresholds with Standard Resources		
Green Thresholds – Cost and Schedule Performance falling outside of yellow or red thresholds		
Yellow Thresholds		
Cost Variance Schedule Variance	Type	Threshold limit
Dollars	Current Period	$\geq \pm 5\%$ to $< \pm 10\%$ and $\geq \$125K$
	Cumulative	$\geq \pm 5\%$ to $< \pm 10\%$ and $\geq \$250K$
Red Thresholds		
Cost Variance Schedule Variance	Type	Threshold limit
Dollars	Current Period	$\geq \pm 10\%$ and $\geq \$250K$
	Cumulative	$\geq \pm 10\%$ and $\geq \$500K$

Note: This applies to SV% (Schedule Variance in %) or CV% (Cost Variance in %) and the SV or CV in \$.

Customer Variance Analysis Report Thresholds with Optional Uncosted Labor Hours		
Green Thresholds – Cost and Schedule Performance falling outside of yellow or red thresholds		
Yellow Thresholds		
Cost Variance Schedule Variance	Type	Threshold limit
Hours	Current Period	$\geq \pm 5\%$ to $< \pm 10\%$ and ≥ 875 hrs.
	Cumulative	$\geq \pm 5\%$ to $< \pm 10\%$ and ≥ 1750 hrs.
Red Thresholds		
Cost Variance Schedule Variance	Type	Threshold limit
Hours	Current Period	$\geq \pm 10\%$ and ≥ 1750 hrs.
	Cumulative	$\geq \pm 10\%$ and ≥ 3500 hrs.

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Note: This applies to SV% (Schedule Variance in %) or CV% (Cost Variance in %) and the SV or CV in hours.

The thresholds in the table above are the default customer variance analysis reporting thresholds to be applied to all projects with the following exception. The customer may determine that based on specific project requirements, risk level, and budget value the project would be managed more effectively utilizing modified thresholds. The customer controlled thresholds must be presented to and approved by the customer, prior to making any changes to these thresholds.

4.5 Estimate to Complete (ETC) / Estimate at Completion (EAC)

On a monthly basis, while generating the MSR, the CAM shall review the ETC for the elements of their control account. Routine EAC analysis and review at the Control Account level by the CAM ensures that the EAC continuously reflects a valid projection of project costs. CAMs review the status of expended effort and the achievability of the remaining forecasted work using all available information to arrive at the best possible EAC.

An ETC revision is performed whenever the current ETC does not accurately reflect the cost and schedule for the remaining work to a degree that the difference would significantly impact the final cost, when a significant change is planned for a CA's work or planning packages, when a variance threshold is exceeded, or when directed by the PM consistent with PEP and customer expectations. A comprehensive total project EAC (bottom-up) is accomplished annually or at major phases of project evolution (i.e. at CD-2, at the completion of design, etc.). The ETC shall take into consideration any cost or schedule variances to date, as well as estimates for pending changes (including field change orders) and mitigation of risk events.

The PM will review the new estimate and determine if he/she agrees with the new estimate. If the PM does not concur with the estimate submitted he/she will discuss the estimate with the CAM and adjust it as appropriate. When the PM approves a submitted estimate the PM forwards, the information to PCs and they update the schedule and cost processor to establish the new project EAC.

Two methods are used to develop the EAC are manual and formula driven (calculated) methods. No single method consistently provides the "best answer." EACs should never entirely be a formula driven number. Formula driven EAC are used as a means of verification or validation that an EAC is reasonable.

A manual EAC analysis is performed by the individual responsible for performing the work. CAMs need to reassess and perform a thorough analysis of the resources required to complete the remaining work scope plus the actual cost incurred to date. The CAM must evaluate the uncompleted baseline schedule activities and assesses the resources required to complete each activity.

The manual EAC may be developed by:

1. Evaluating the efficiency achieved by performing organizations for completed work and comparing it to remaining budgets
2. Establishing a schedule forecast that reflects the expected time-frame for completing the remaining work
3. Considering all remaining risk areas on the project versus cost avoidance possibilities

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4. Ensuring the most current direct and indirect rate structure is used to price out the projected resources
5. Applying this analysis to future efforts to derive the most accurate estimate

Formula driven (or sometimes referred to as “calculated” or “independent”) EACs can be used to compare results of the CAM’s estimate. Applying the current cost performance factor to the remaining work often reflects a more accurate trend compared to other methods because performance is not likely to improve significantly for the remaining work. However, to accurately represent the project and the stage of project completion, the appropriate EAC formulas must be chosen. Some of the more common formulas for calculating EACs are presented below.

The performance-index-adjusted, end-of-project calculations assume that the remainder of the project will be performed at the same efficiency as the performance on the project to date. These measures are calculated by:

$$\text{Estimate-at-Completion (EAC)}_{\text{cpi}} = \text{ACWP} + [(\text{BAC} - \text{BCWP}) / (\text{CPI})]$$

$$\text{Estimate-at-Completion (EAC)}_{\text{Composite}} = \text{ACWP} + [(\text{BAC} - \text{BCWP}) / (\text{CPI} \times \text{SPI})]$$

$$\text{Estimate-at-Completion (EAC)}_{3\text{periodCPI}} = \text{ACWP} + [(\text{BAC} - \text{BCWP}) / (\text{CPI}_{3\text{period}})]$$

$$\text{Variance-at-Completion (VAC)} = \text{BAC} - \text{EAC}$$

A related metric is the To-Complete Performance Index (TCPI), which computes the required future cost efficiency to achieve a target BAC or EAC. It is calculated by dividing budgeted remaining work by the remaining dollars to EAC, or $\text{TCPI}_{\text{EAC}} = (\text{BAC} - \text{BCWP}) / (\text{EAC} - \text{ACWP})$

4.6 Monthly Status Meetings

The CAMs shall present status information on request at the monthly PMG meetings. Participants at the meeting will consider the impact and risks of reported variances on other areas of the project.

4.7 Monthly Reporting Format

The specific EVMS reporting format will be determined on a project-by-project basis and incorporate customer specific requirements. As a minimum, it will contain the data referenced in the FRA EVMS Description. Reporting will be at a level of the WBS agreed to by the customer (by DOE for DOE projects). The Project Manager shall prepare and submit a Project MSR to the customer and the project sponsor, as well as for internal project distribution.

The report will contain, at a minimum, the standard CPR1 format, a narrative summary of the analysis of those variances that fall within the red thresholds as well as a monthly management reserve and contingency summary.

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Example of MR and contingency summary

PMB	From CPR1	\$xxx,xxx.xx	
EAC	From CPR1		\$xxx,xxx.xx
MR	For known risks		\$xx,xxx.xx
TPC			\$yyy,yyy.yy
Contingency	For unknown risks = TPC-EAC-MR		\$zzz,zzz.zz

4.8 Documents and Records

MSR documents and records generated as a result of implementing this procedure shall be maintained by the specific project. Project Controls is responsible for maintaining the records of data compiled to create MSRs in accordance with the project's configuration management plan.

4.9 Schedule for Monthly Reporting Cycle

The Office of Project Support Services (OPSS) issues an EVMS Processing Calendar prior to each fiscal year. The calendar identifies deadlines for monthly status and actual cost integration; producing internal and external performance reports, including VARs; and the timing for submitting, approving and implementing Baseline Change Requests (BCR). It allows for quality checks and adjustments and allows time for distributing performance reports in advance of monthly PMG and Project Oversight Group (POG) meetings. The calendar is posted by OPSS and is distributed to Project Controls and Project Finance (see example in Appendix I). The calendar is provided as a guideline, but projects should make adjustments as needed. For example, the calendar shows the PMG on Tuesday, but the actual day of the PMG may vary. However, some dates are fixed such as PARS-II upload and financial month end.

Typically external monthly reports are to be submitted to the customer no later than the last day of the month that follows the month in which the work was performed. The month in which the work was performed is also known as the reporting period. In order to meet this schedule, adjustments or validation of the RLS and ETC, as well as processing of change requests, must occur early in the cycle. CPRs and VARs can then be produced and circulated to the project team and lab management for feedback before final submission to the customer.

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5.0 REFERENCES

DOE Order 413.3B, *Program and Project Management for the Acquisition of Capital Assets*
FRA *Earned Value Management System Description*
ANSI/EIA-748-B, *Earned Value Management Systems*

6.0 APPENDICES

12.PM-006A: Appendix A: Signature Page and Revision History
12.PM-006B: Appendix B: Acronyms and Glossary
12.PM-006C: Appendix C: Monthly Status - Reporting Flowchart
12.PM-006D: Appendix D: Cost Performance Report – Sample
12.PM-006E: Appendix E: Variance Analysis Report – Sample
12.PM-006F: Appendix F: Correction Action Log
12.PM-006 G: Appendix G: Management Analysis Report – Sample
12.PM-006H: Appendix H: Customer Analysis Report - Sample
12.PM-006I: Appendix I: Standard EVMS Processing Calendar - Sample

Appendix A
SIGNATURE PAGE AND REVISION HISTORY

This procedure approved by: _____

Marc Kaducak

Head, Office of Project Support Services

Fermi National Accelerator Laboratory

DATE

7/5/2016

TABLE OF REVISIONS

Author(s)	Description	Revision	Date
	Initial Version	0	10/17/08
E. McCluskey	In Appendix B changed the definition of Control Account and added a definition for Control Account Manager. Added clarification on Variance Thresholds and Estimate at Completion.	1	12/09/08
D. Hoffer	Revised variance reporting from three-month rolling average to the current period. Sections 4.1 - 4.4 and Appendix D were revised to reflect this change and clarification of some wording.	2	01/22/09
E. McCluskey	Revised variance analysis thresholds. Added and clarified management and customer analysis report. Added clarification on ETC/EAC.	3	03/27/09
E McCluskey	Included uncosted labor hours as measure for analysis and reporting; revised variance threshold tables to include hours as well new cumulative \$ amounts; noted requirement for contingency and MR summary in monthly report; replaced flowchart with Visio version	4	09/17/09
M. Kaducak	Updated reference to DOE O 413.3A to DOE O 413.3B. Added Section 4.9 on the calendar for monthly reporting cycle. Added statement that CAMs cannot approve their own VARs Elaborated on section 4.5 to include specific formulae and conditions under which an EAC/ETC must be performed, updated flowchart in Appendix C. Changed OPMO to OPSS	5	08/18/13
R. Marcum	Updated VAR threshold tables to clarify optional hour reporting for uncosted labor. Clarified standard monthly timetable and PCS responsibilities. Updated Appendix examples.	6	11/20/15

R. Marcum	Incorporated changes suggested by the annual EVMS surveillance, further clarified expectations of uncostered labor, removed the restriction that PM cannot approve their own VARs, updated corrective action log expectations per consensus of HEP laboratory workshop, other minor updates.	6.1	7/5/16
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APPENDIX B Acronyms and Glossary

BCR — Baseline Change Request
BCWP — Budgeted Cost of Work Performed
CA — Control Account
CAM — Control Account Manager
CD — Critical Decision
CPI — Cost performance Index
CPR — Cost Performance Report
DOE — Department of Energy
EAC — Estimate at Completion
ETC — Estimate to Complete
EVMS — Earned Value Management System
MSR — Monthly Status Report
OPSS — Office of Project Support Services
PCs — Project Controls
PCS — Project Controls Specialist
PEP — Project Execution Plan
PFA — Project Financial Analyst
POG — Project Oversight Group
PM — Project Manager
PMB — Performance Measurement Baseline
PMG — Project Management Group
PMP — Project Management Plan
PMT — Performance Measurement Technique
RAM — Responsibility Assignment Matrix
RLS — Resource Loaded Schedule
SPI — Schedule Performance Index
TPC — Total Project Cost
VAR — Variance Analysis Report
WBS — Work Breakdown Structure
WP — Work Package

Control Account (CA) - A key management control point located at the natural intersection point of the WBS and the OBS, where functional responsibility for work is assigned. It represents the point at which budgets (resource plans) and actual costs are accumulated and compared to earned value for management control purposes.

Control Account Manager (CAM) – The member of the project team responsible for the performance defined in a Control Account and for managing the resources authorized to accomplish the tasks.

Cost Performance Index (CPI) - The ratio of earned value to actual costs (BCWP/ACWP); a value greater than one denotes favorable performance. CPI is often used to predict the magnitude of possible cost deviations from the baseline.

Cost Variance in % (CV%) – The percent of the ratio of cost variance to earned value ((CV/BCWP) X 100)

Estimate at Completion (EAC) - The latest revised cost estimate for a given work scope.

Estimate to Complete (ETC) - Estimate of costs to complete all work from a point in time to the end of the project.

Kind Work – Work scope that is contributed by collaborators outside FRA, produces a physical deliverable and is not included in the Total Project Cost. Scientific effort specifically as described in the “OHEP Policies to Ensure Compliance with DOE O413.3A,” is not considered in-kind work.

Performance Measurement Baseline (PMB) - The collected key performance, scope, cost, and schedule parameters. The Performance Measurement Baseline defines the threshold and boundary conditions for a project.

Performance Measurement Technique (PMT) – A defined method of earning value in relation to the resources expended. Also known as Earned Value Methodology.

Project Controls – Project support staff for planning, baseline development, management system plan preparation, as well as for monitoring, assessing, controlling, and reporting progress against the project baseline.

Project Execution Plan (PEP) - The plan for the execution of the project, which establishes roles and responsibilities and defines how the project will be executed. Every project implementing Earned Value management will have a unique project execution plan.

Project Financial staff – Project support staff for preparing cost information for monthly reports, monitoring expenditures, tracking spending deviations from baseline plans, preparing the Project Accounting task structure, tracking requisitions, and developing interfaces for financial information from external entities such as other laboratories and universities.

Project Management Group (PMG) Representatives of FRA’s and the customer’s management meets on a regular basis with the Project’s management to review project status.

Project Management Plan (PMP) – The plan for management of the project by the project manager, which provides further details beyond the Project Execution Plan.

Responsibility Assignment Matrix (RAM) - A structure that relates the project organization structure to the work breakdown structure to help ensure that each element of the project’s scope of work is assigned to a responsible individual.

Schedule Performance Index (SPI) - A schedule performance indicator relating work accomplished to the planned schedule (BCWP/BCWS). A value greater than one denotes favorable performance.

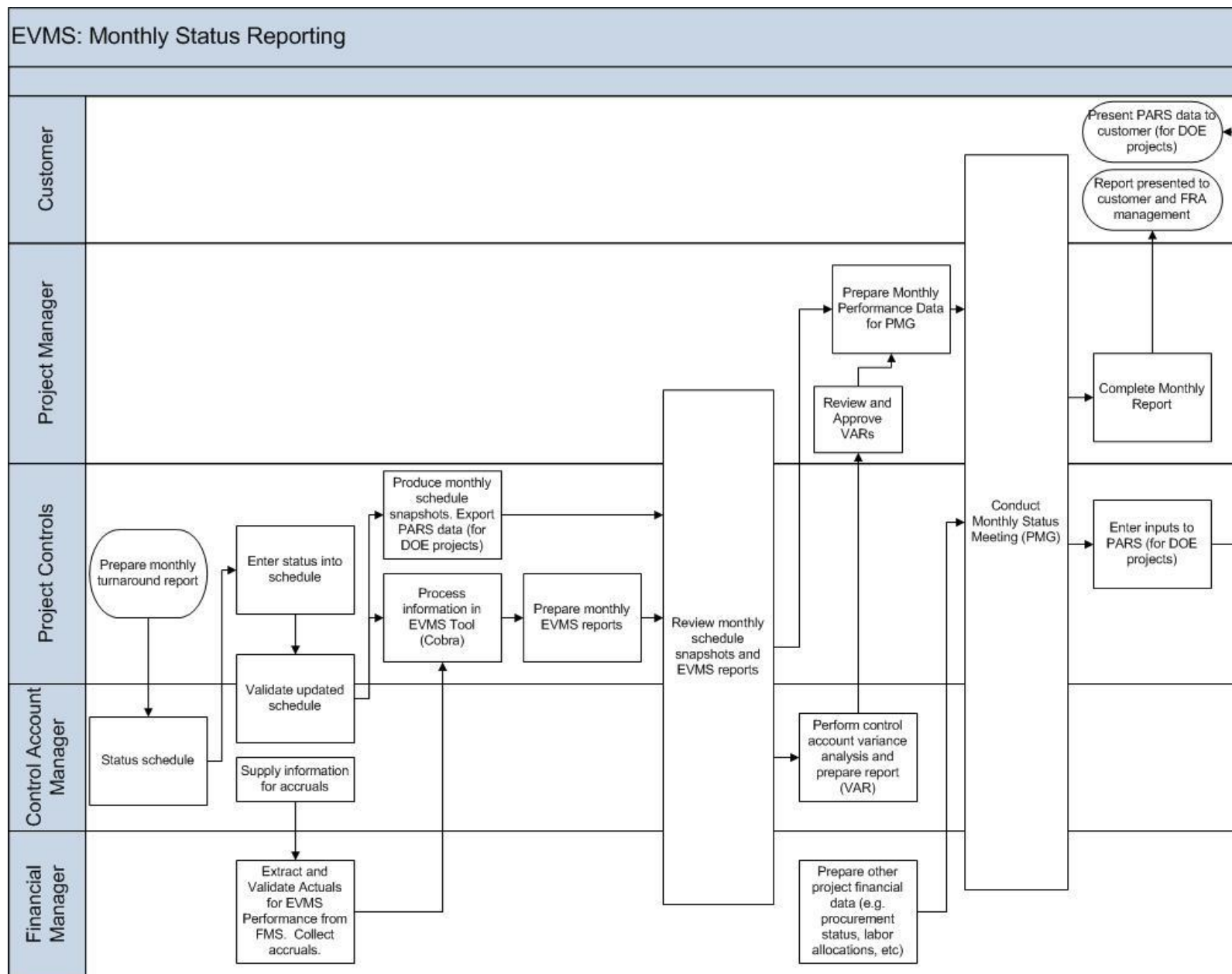
Schedule Variance in % (SV%) - The percent of the ratio of schedule variance to budget ((SV/BCWS) X 100)

Uncosted Labor – Also referred to as in-kind or contributed labor. This labor is accounted for in work package estimates, but at a \$0 rate in the budget. Such a rate may be used for scientific effort at the customer’s direction.

Work Breakdown Structure (WBS) - A product-oriented grouping of project elements that organizes and defines the total scope of the project. The WBS is a multilevel framework that organizes and graphically displays elements representing work to be accomplished in logical relationships. Each descending level represents an increasingly detailed definition of a project component. Project components may be products or services. It is the structure and code that integrates and relates all project work (technical, schedule, and cost) and is used throughout the life cycle of a project to identify and track specific work scopes.

Work Package (WP) – A task or set of tasks performed within a control account. The work package is the lowest level activity to which resources are assigned.

APPENDIX C Monthly Reporting Flowchart



APPENDIX D Cost Performance Report

CPR1

CONTRACT PERFORMANCE REPORT FORMAT 1 - WORK BREAKDOWN STRUCTURE													
1. CONTRACTOR				2. CONTRACT				3. PROGRAM				4. REPORT PERIOD	
a. NAME				a. NAME				a. NAME Sample Project				a.FROM 01-Feb-2008 b.TO 29-Feb-2008	
B. PERFORMANCE DATA													
ITEM (1)	CURRENT PERIOD					CUMULATIVE TO DATE					AT COMPLETION		
	BUDGETED COST		ACTUAL COST WORK	VARIANCE		BUDGETED COST		ACTUAL COST WORK	VARIANCE		BUDGETED (14)	ESTIMATED (15)	VARIANCE (16)
	WORK SCHEDULED	WORK PERFORMED		SCHEDULE	COST (6)	WORK SCHEDULED	WORK PERFORMED		SCHEDULE	COST (11)			
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)			
EQ DOE													
1.3 Title I Fully burdened AY\$	63,546	61,156	36,733	(2,390)	24,423	219,019	145,073	161,960	(73,946)	(16,887)	320,302	337,189	(16,887)
2.3 Title II Fully burdened AY\$	95,440	109,061	105,777	13,621	3,284	561,688	582,399	582,955	20,711	(556)	1,216,518	1,219,287	(2,769)
3.3 Far Site Construction Fully burdened AY\$	35,570	30,013	29,888	(5,557)	125	167,816	143,905	151,672	(23,912)	(7,767)	560,022	579,514	(19,492)
4.3 Project Management Fully burdened AY\$	2,155	1,158	36,357	(997)	(35,199)	55,167	55,167	92,224	0	(37,057)	685,869	725,189	(39,320)
Funding TypeTotals:	196,711	201,388	208,755	4,678	(7,366)	1,003,691	926,544	988,811	(77,147)	(62,267)	2,782,711	2,861,179	(78,468)
Undist. Budget											0	0	0
Sub Total	196,711	201,388	208,755	4,678	(7,366)	1,003,691	926,544	988,811	(77,147)	(62,267)	2,782,711	2,861,179	(78,468)
Management Resrv.											517,289		
Total	196,711	201,388	208,755	4,678	(7,366)	1,003,691	926,544	988,811	(77,147)	(62,267)	3,300,000		

APPENDIX E Variance Analysis Report

CPR5

Variance Analysis Report									
CA: CAM:			Project: Period Ending:						
Report in \$K									
Period	Budget	Earned	Actuals	SV (\$)	SV (%)	CV (\$)	CV (%)	SPI	CPI
Current:	137	204	122	67	49%	82	40%	1.49	1.68
Cumulative:	8,059	7,565	8,309	(493)	-6%	(744)	-10%	0.94	0.91
	BAC	EAC		VAC (\$)	VAC (%)				
At Complete:	25,164	26,006		(842)	-3%				
Variance thresholds: Yellow ±\$50K & ±5% Current; ±\$100K & ±5% Cumulative. Red ±\$100K & ±10% Current; ±\$200K & ±10% Cumulative									
Explanation of Variance/Description of Problem: Current: Cumulative:									
Impact: 									
Corrective Action: 									
Monthly Summary: 									
Prepared by:			CAM			Date:			
Reviewed by:			PCS			Date:			
Approved by:			PM			Date:			

APPENDIX F Correction Action Log

ID#	CA#	DESCRIPTION	APPROVAL DATE	CLOSED DATE	RESPONSIBILITY

APPENDIX G Management Analysis Report

Report Period: Feb-09																				
Control Account	Cur. Period BCWS (AY\$)	BCWP (AY\$)	ACWP (AY\$)	SV (AY\$)	SV (%)	CV (AY\$)	CV (%)	SPI	CPI	Cumulative BCWS (AY\$)	BCWP (AY\$)	ACWP (AY\$)	SV (AY\$)	SV (%)	CV (AY\$)	CV (%)	SPI	CPI	BAC (AY\$)	
R&D																				
1.0.0 ANU CDR COSTS	0	0	0	0	0%	0	0%	1.00	1.00				18,830	0	0%	-18,830	-100%	1.00	0.00	0
1.0.1 RR Upgrades	457,056	100,207	121,072	-356,849	-78%	-20,865	-4%	0.22	0.83	1,324,028	1,154,549	1,233,813	-169,479	-13%	-79,284	-7%	0.87	0.94	5,248,666	
1.0.2 M Upgrades	44,062	36,493	20,431	-7,569	-17%	-16,063	-36%	0.83	1.79	109,572	142,650	151,884	33,078	30%	33,078	30%	1.30	0.94	1,037,303	
1.0.3 NuMI Upgrades	238,849	20,992	31,614	-217,857	-91%	-10,622	-4%	0.09	0.66	411,941	771,482	426,182	359,549	87%	345,290	45%	1.87	1.81	2,118,285	
1.0.4 ANU Beam Physics	6,792	7,469	0	6,792	100%	7,469	110%	1.10	N/A	36,165	41,578	0	5,413	15%	41,578	110%	1.15	N/A	82,092	
1.0.5 ANU Project Management	0	0	-1,373	0	0%	1,373	-100%	1.00	0.00	344,698	344,698	258,682	0	0%	86,005	25%	1.00	1.33	344,698	
1.1 Site and Building R&D	0	0	40,234	0	0%	-40,234	-100%	1.00	0.00	2,274,519	2,274,519	1,686,483	0	0%	608,036	27%	1.00	1.36	2,274,519	
1.2 Liquid Scintillator R&D	11,940	4,221	2,246	-7,719	-65%	-1,978	-17%	0.35	1.88	263,858	258,164	211,138	-7,694	-3%	45,025	17%	0.97	1.21	271,245	
1.3 WLS Fiber R&D	25,303	87,109	100,942	61,807	244%	-13,833	-53%	3.44	0.86	172,208	234,014	260,922	61,807	36%	-26,507	-15%	1.36	0.90	340,905	
1.4 PVC Extrusion R&D	81,085	0	19,829	-81,085	-100%	-19,829	-100%	0.00	0.00	1,006,723	938,211	974,916	-68,512	-7%	-38,705	-4%	0.93	0.96	1,348,994	
1.5 PVC Module R&D	286,736	25,200	0	-261,535	-91%	25,200	100%	0.09	N/A	829,196	550,292	1,041,055	-278,904	-34%	-430,763	-84%	0.66	0.53	1,589,548	
1.6 Electronics R&D	155,840	19,443	14,471	-136,397	-88%	4,972	3%	0.12	1.34	429,049	313,030	549,846	-116,019	-27%	-236,816	-76%	0.73	0.57	1,473,437	
1.7 DAQ R&D	125,175	1,747	17,983	-123,429	-99%	-16,236	-13%	0.01	0.10	339,419	218,044	798,136	-121,375	-36%	-580,092	-266%	0.64	0.27	1,383,728	
1.8 Detector Assembly R&D	260,125	13,117	36,482	-247,007	-95%	-23,365	-9%	0.05	0.36	1,270,768	878,966	1,733,144	-391,802	-31%	-854,178	-97%	0.69	0.51	2,850,906	
1.9 Project Management R&D	0	0	0	0	0%	0	0%	1.00	1.00	9,184,127	9,184,127	9,359,785	0	0%	175,658	2%	1.00	0.98	9,184,127	
Construction																				
2.0.1.1 Recycler Ring Modifications	25,264	2,347	1,033	-22,917	-91%	1,314	5%	0.09	2.27	25,264	2,347	1,033	-22,917	-91%	1,314	5%	0.09	2.27	7,916,804	
2.0.1.2 Recycler Kicker System	164,666	4,207	344	-160,459	-97%	3,863	2%	0.03	12.22	164,666	4,207	344	-160,459	-97%	3,863	2%	0.03	12.22	7,910,714	
2.0.1.3 Recycler Instrumentation	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	1,421,492	
2.0.2.1 MI Modifications	1,637	0	0	-1,637	-100%	0	0%	0.00	1.00	1,637	1,395	0	-242	-15%	1,395	100%	0.85	N/A	373,332	
2.0.2.2 MI RF Cavities	10,572	1,945	14,602	-8,626	-82%	-12,657	-87%	0.18	0.13	10,572	3,891	14,802	-6,681	-63%	-10,711	-101%	0.37	0.27	1,433,092	
2.0.3.1 NuMI Primary Proton Beam	116,304	0	7,487	-116,304	-100%	-7,487	-100%	0.00	0.00	116,304	13,636	7,487	-102,668	-88%	8,149	45%	0.12	1.82	1,450,655	
2.0.3.2 NuMI Target Hall Infrastructure	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	1,634,201	
2.0.3.3 NuMI Target Hall Infrastructure	0	22,148	8,835	22,148	100%	13,313	60%	N/A	2.56	0	22,148	8,835	22,148	100%	13,313	60%	N/A	2.56	1,716,959	
2.0.3.4 NuMI Decay Pipe/Hadron Absorber/Utilities	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	928,793	
2.0.4 Project Management - ANU - Construction	67,852	24,936	0	-67,852	-100%	24,936	37%	0.27	0.72	274,403	274,403	250,793	23,610	9%	23,610	9%	1.00	1.00	5,159,684	
2.1.1 Site Preparation Package	13,820	13,820	23,000	0	0%	0	0%	1.00	0.60	384,006	368,859	281,707	-17,147	-4%	85,152	23%	0.96	0.30	11,530,402	
2.1.2 Far Detector Building	83,769	420,841	23,000	537,872	402%	357,841	95%	5.02	10.38	96,226	1,055,889	675,909	959,683	957%	370,579	352%	10.97	1.58	36,637,247	
2.1.3 Site and Building Security	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	195,804	
2.1.4 Management - Site and Building - Construction	15,653	0	0	-15,653	-100%	0	0%	0.00	1.00	15,653	0	0	-15,653	-100%	0	0%	0.00	1.00	171,599	
2.10 Project Management - Nova Project - Construction	61,975	61,975	55,200	0	0%	6,775	11%	1.00	1.12	730,227	730,227	588,898	0	0%	141,330	19%	1.00	1.24	5,561,928	
2.2.1 Mineral Oil	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	12,887,277	
2.2.2 Pseudocumene	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	1,289,109	
2.2.3 WaveShifters and Stadis 425	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	2,242,998	
2.2.4 Blending	3,358	3,358	0	0	0%	3,358	100%	1.00	N/A	3,358	3,358	0	0	0%	3,358	100%	1.00	N/A	747,442	
2.2.5 Transport - Liquid Scintillator	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	1,455,419	
2.2.6 Management - Liquid Scintillator - Construction	1,854	1,854	0	0	0%	1,854	100%	1.00	N/A	1,854	1,854	0	0	0%	1,854	100%	1.00	N/A	93,772	
2.3.1 Procurement - WLS Fiber	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	84,360	
2.3.2 Production - WLS Fiber	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	9,958,779	
2.3.3 Management - WLS Fiber - Construction	863	863	0	0	0%	863	100%	1.00	N/A	863	863	0	0	0%	863	100%	1.00	N/A	37,646	
2.4.1 Procurement - PVC Extrusions	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	177,691	
2.4.2 Extrusion Pre-Production	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	1,172,758	
2.4.3 Extrusion Production	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	21,776,474	
2.4.4 Production Quality Assurance and Extrusion Evaluation	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	605,199	
2.4.5 Shipping & Handling - PVC Extrusions	71,296	0	0	-71,296	-100%	0	0%	0.00	1.00	71,296	0	0	-71,296	-100%	0	0%	0.00	1.00	782,062	
2.4.6 Management - PVC Extrusions - Construction	8,637	1,402	0	-7,235	-84%	1,402	16%	0.16	N/A	8,637	1,402	0	-7,235	-84%	1,402	16%	0.16	N/A	761,816	
2.5.1 End Seals	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	1,988,372	
2.5.2 Optical Connector Production	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	118,077	
2.5.3 Module Production	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	7,603,656	
2.5.4 Management - PVC Modules - Construction	12,092	12,092	0	0	0%	12,092	100%	1.00	N/A	61,067	61,067	0	0	0%	61,067	100%	1.00	N/A	785,531	
2.6.1 APD Module Production	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	6,288,235	
2.6.2 Readout - FEB	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	2,610,747	
2.6.3 Readout Infrastructure	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	2,905,067	
2.6.4 Management - Electronics - Construction	751	751	0	0	0%	751	100%	1.00	N/A	751	751	0	0	0%	751	100%	1.00	N/A	39,179	
2.7.1 DAQ Software	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	778,265	
2.7.2 DAQ Hardware	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	2,100,306	
2.7.3 Integration - DAQ	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	441,042	
2.7.4 Detector Control System	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	204,894	
2.7.5 Management - DAQ - Construction	213	213	0	0	0%	213	100%	1.00	N/A	213	213	0	0	0%	213	100%	1.00	N/A	7,464	
2.8.1 Near Detector Site Preparation	25,555	4,814	46,427	-20,740	-81%	-41,613	-164%	0.19	0.10	25,555	66,056	46,427	40,501	157%	19,826	78%	2.58	1.42	3,578,374	
2.8.2 Mechanical Construction and Installation - Near Detector Ass	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	492,573	
2.8.3 Liquid Scintillator Filling Equipment - Near Detector Assemb	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	54,128	
2.8.4 Installation Coordination - Near Detector Assembly	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	32,051	
2.8.5 Management - Near Detector Assembly - Construction	1,596	1,596	0	0	0%	1,596	100%	1.00	N/A	1,596	1,596	0	0	0%	1,596	100%	1.00	N/A	91,930	
2.9.1 Mechanical Systems - Far Detector Assembly	27,012	0	0	-27,012	-100%	0	0%	0.00	1.00	29,400	2,028	4,892	-27,012	-92%	-2,898	-10%	0.07	0.43	1,790,369	
2.9.2 Detector Infrastructure - Far Detector Assembly	34,746	0	0	-34,746	-100%	0	0%	0.00	1.00	34,746	0	0	-34,746	-100%	0	0%	0.00	1.00	475,003	
2.9.3 Scintillator Filling Equipment - Far Detector Assembly	49,978	0	0	-49,978	-100%	0	0%	0.00	1.00	49,978	0	0	-49,978	-100%	0	0%	0.00	1.00	468,394	
2.9.4 Block Assembly and Installation - Far Detector Assembly	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	7,705,179	
2.9.5 Management - Far Detector Assembly - Construction	8,492	8,492	0	0	0%	8,492	100%	1.00	N/A	42,887	42,887	0	0	0%	42,887	100%	1.00	N/A	967,339	
R&D SubTotal (WBS 1.0-1.9)	1,692,983	315,999	403,930	-1,376,984																

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APPENDIX H Customer Analysis Report

Report Period: Dec-08												
	Current Period					Cumulative						
WBS Level 2	BCWS (AY\$)	BCWP (AY\$)	ACWP (AY\$)	SPI	CPI	BCWS (AY\$)	BCWP (AY\$)	ACWP (AY\$)	SV (AY\$)	CV (AY\$)	SPI	CPI
R&D												
1.0 ANU R&D	11,282	148,680	34,144	13.18	4.35	1,469,499	2,239,748	1,763,926	770,249	475,822	1.52	1.27
1.1 Site and Building R&D	35,558	16,001	265,893	0.45	0.06	2,203,404	2,274,519	1,493,436	71,115	781,083	1.03	1.52
1.2 Liquid Scintillator R&D	8,436	8,436	2,441	1.00	3.46	243,482	243,507	200,578	25	42,929	1.00	1.21
1.3 WLS Fiber R&D	12,635	11,149	28,816	0.88	0.39	146,905	143,189	159,848	-3,716	-16,659	0.97	0.90
1.4 PVC Extrusion R&D	0	6,198	12,405	N/A	0.50	925,639	931,837	948,616	6,198	-16,780	1.01	0.98
1.5 PVC Module R&D	0	3,239	128,231	N/A	0.03	540,108	512,507	1,020,264	-27,600	-507,757	0.95	0.50
1.6 Electronics R&D	0	2,748	17,600	N/A	0.16	273,209	286,484	523,098	13,275	-236,614	1.05	0.55
1.7 DAQ R&D	0	2,053	1,593	N/A	1.29	214,243	216,297	778,955	2,053	-562,658	1.01	0.28
1.8 Detector Assembly R&D	50,788	21,031	81,415	0.41	0.26	919,841	865,571	1,628,883	-54,270	-763,312	0.94	0.53
1.9 Project Management R&D	0	0	0	1.00	1.00	9,184,127	9,184,127	9,359,813	0	-175,686	1.00	0.98
Construction												
2.0 ANU Construction	0	1,167	30,671	N/A	0.04	206,551	221,354	214,470	14,804	6,885	1.07	1.03
2.1 Site and Building	13,820	474,404	46,000	34.33	10.31	368,823	768,167	865,617	399,344	-97,450	2.08	0.89
2.10 Project Management - Nova Project - C	61,975	61,975	39,585	1.00	1.57	606,278	606,278	491,909	0	114,369	1.00	1.23
2.2 Liquid Scintillator	0	0	0	1.00	1.00	0	0	0	0	0	1.00	1.00
2.3 WLS Fiber	0	0	0	1.00	1.00	0	0	0	0	0	1.00	1.00
2.4 PVC Extrusions	0	0	0	1.00	1.00	0	0	0	0	0	1.00	1.00
2.5 PVC Modules	12,092	12,092	0	1.00	N/A	36,882	36,882	0	0	36,882	1.00	N/A
2.6 Electronics	0	0	0	1.00	1.00	0	0	0	0	0	1.00	1.00
2.7 DAQ	0	0	0	1.00	1.00	0	0	0	0	0	1.00	1.00
2.8 Near Detector Assembly	0	0	0	1.00	1.00	0	61,242	0	61,242	61,242	N/A	N/A
2.9 Far Detector Assembly	8,492	8,492	0	1.00	N/A	27,930	27,930	4,692	0	23,238	1.00	5.95
R&D SubTotal (WBS 1.0-1.9)	118,698	219,534	572,538	1.85	0.38	16,120,458	16,897,786	17,877,417	777,328	-979,631	1.05	0.95
Construction SubTotal (WBS 2.0-2.9)	96,380	558,131	116,256	5.79	4.80	1,246,463	1,721,853	1,576,687	475,390	145,166	1.38	1.09
Project Total	215,078	777,665	688,794	3.62	1.13	17,366,921	18,619,638	19,454,104	1,252,718	-834,465	1.07	0.96

APPENDIX I Standard EVMS Processing Calendar

